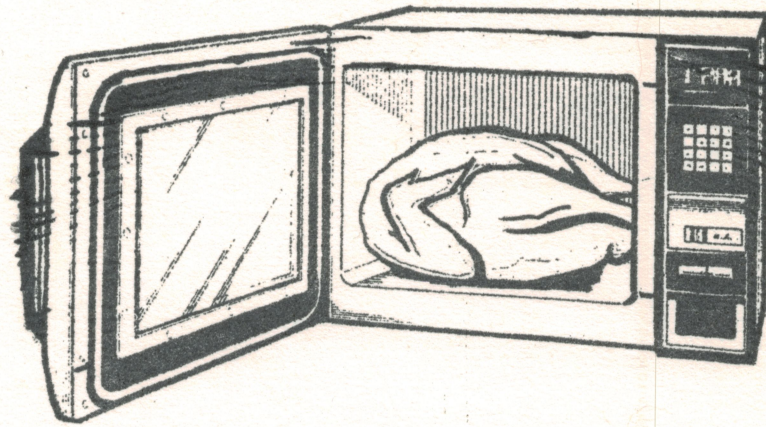




Saskatchewan
Consumer Affairs

In Search of a Microwave Oven



Saskatchewan

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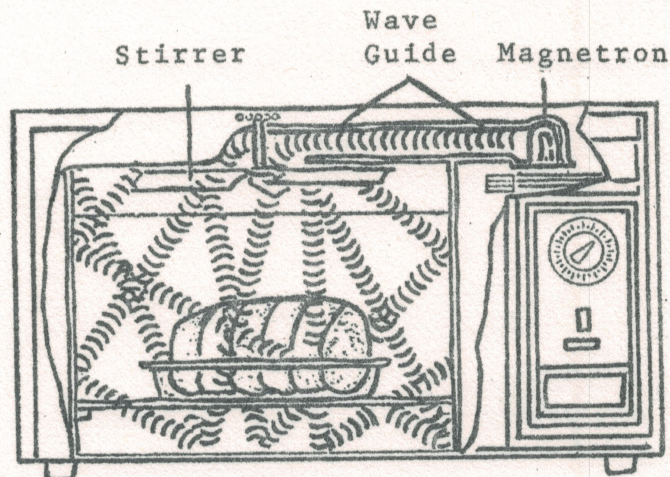
MICROWAVE OVENS

Say "microwave ovens" and instantly cooked food comes to mind. Speed is the one big advantage that this newcomer offers. It cooks in a different way from the other appliances in your kitchen.

In a regular stove, the liquid or air around the food is first heated and then the heat is conveyed to the outside of the food. As the heat is gradually conducted inside, cooking takes place.

In microwave ovens, very high frequency radio waves penetrate the food causing the individual molecules to shake as much as 2,450 million times a second. Resulting friction produces enough heat to cook some foods in seconds.

A microwave oven is not a complex device. The magnetron tube (generator that produces the microwaves) operates from an electrical power supply. A metal tunnel or wave guide feeds microwave energy from this magnetron tube, into the metal lined oven cavity. A rotating metal paddle or stirrer helps to distribute the energy.



Foods cooked by microwaves do not become radioactive and are safe to eat. However, the microwaves inside electronic ovens are dangerous. Although microwave radiation is not the same as X-ray, or nuclear radiation, a high enough level can be harmful. Microwaves can interact with body tissue to produce heat just as they do with food. For example, the eye is susceptible to damage in the form of cataracts¹. Interference with heart pacemakers is another hazard.

Since research is still being carried on in the area of effects from microwave radiation, health authorities have allowed large safety margins in setting of exposure limits. In a properly designed oven, microwaves are confined within the interior and exposure to nearby persons is minimal. The Health Protection Branch of the Department of National Health and Welfare has regulations which govern the design, construction and function of microwave ovens. These are in effect under The Radiation Emitting Devices Act².

In addition, it is important for a user of a microwave oven to follow safety procedures. Cooking with a microwave oven is only as safe as the owner's proper and careful use of it.

1. The lowest microwave intensity known to produce cataracts is about 50 milliwatts per square centimetre - Information Bulletin, Health Protection Branch - Health and Welfare, (Canada)

2. Appendix I

Safety Guidelines for Proper Operation of a Microwave Oven

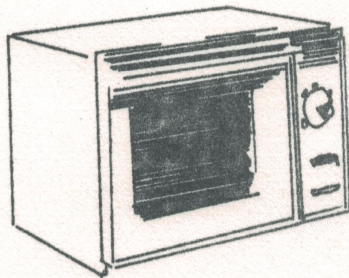
1. Read and follow instructions in the manual supplied by the manufacturer.
2. Cut down on exposure time around operating ovens. Keep face and eyes away from oven at all times when foods are cooking.
3. Never insert any object through door or around door seal or viewing screen. This could cause oven leakage.
4. Never tamper with any button or pin connected with door hinges or latch, since it may be part of the safety mechanism used to shut off power when door is opened. (Oven safety interlocks).
5. Clean oven door seals often, with water and mild detergent - not abrasive cleansers.
6. Do not operate oven when it is empty.
7. Have the oven examined for leakage by a qualified person³ every two years or every year if usage is heavy.
8. Do not operate an oven which is damaged or thought to be damaged, until it has been checked and/or repaired by a qualified serviceman.

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3. In Saskatchewan check with the Radiation Safety Unit (1150 Rose Street, Regina - 565-4538) of the Occupational Health Safety Division - Labor Department, Province of Saskatchewan. A Radiation Health Officer will examine your oven for leakage.

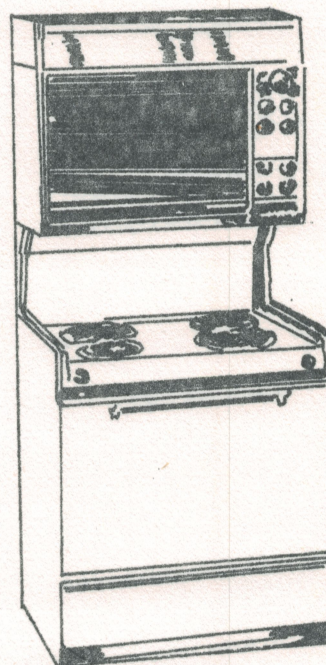
Type, Size, Cost and Warranties

Microwave ovens come in two basic styles.

Portable



Freestanding



Type, Size, Cost and Warranties con't.

- a. Portable or counter top models range in weight from 70 to 100 pounds and cost from \$500 to \$600. They plug into a grounded 120 volt circuit.
- b. A free standing style combines both microwave and conventional cooking compartments. The cost is around \$2,500 (at present this type is sold only in Regina and Saskatoon because of servicing requirements). Such a range will require its own 220 volt line.
- c. Most microwave ovens operate on 2,450 megahertz⁴. If you want to cook very large foods you might consider a unit with a 915 megahertz frequency (uses a larger wavelength for deeper penetration).
- d. Check the outside and inside dimensions carefully. A portable listed at 16" x 22" x 18" may be only 8" x 14" x 14" inside.
- e. Warranties on microwave ovens are divided into two parts -- a warranty on the total oven, and usually a longer warranty on the magnetron tube. The magnetron is generally made to last about ten years. If it breaks down after the warranty expires, it could be costly to replace. It is a good idea to make certain the dealer can service microwave equipment. Check also whether the service is done in the home.

Advantages of Microwave Ovens

- A microwave oven will cook almost anything a regular oven will, but much faster. It will reheat food quickly with little or no loss of the original nutrition, moisture or flavor. This can be a boon if members of the family have differing mealtimes or are away from the home during the day. Meals can be prepared ahead of time, if necessary frozen, and reheated when needed.
- Compared to conventional ranges, microwave cooking should be less costly. About 90% of the power delivered to the oven is absorbed by the food.

4. Megahertz -- million cycles per second.

- Utensils, oven walls and the kitchen should remain comfortably cool.
- Ease of cleaning should be considered. Spatters do not bake on oven walls and fewer baking dishes need to be used.
- Household chores such as defrosting foods, warming baby bottles, freshening breads, melting butter, chocolate, etc., are simplified and take less time when you use a microwave oven.

Limitations of Microwave Ovens

- Some foods do not cook as well in microwave ovens as they do in regular ones. Bakery products and souffles, for example, cook too fast and do not rise or set properly. Lack of browning is a drawback. Ultrafast cooking means some meats (especially thinner cuts) come out a somewhat unappetizing grey color. Tough cuts of meat do not have time to cook to a tender state. In fact, any foods containing protein (meat, eggs, cheese, etc.) tend to toughen to some degree in a microwave oven.
- Cooking time is a variable factor in a microwave oven. Timing can depend on the food's starting temperature, the amount of food and its density. One potato may bake in 4 minutes but three may take 9 minutes. A pound of cake, being less dense, will cook faster than a pound of meat.
- The microwave oven is not designed for quantity cooking.
- Cooking uniformity is sometimes hard to achieve in a microwave oven. The load size and position of individual portions can influence the degree of cooking in the separate items. This unevenness is a limitation in microwave defrosting also.

Options Available in Microwave Ovens

- You can pay extra for a browning system. One system uses an infrared element to brown the food, usually after cooking. Another system has separate utensils which absorb microwave energy and sear the food. Both types seem to involve more time -- both in cooking and cleaning.
- With automatic defrosting foods can be defrosted without cooking them at the same time. In one method, power is switched off and on at intervals to get even thawing. The second method gives a choice of two speeds with the low setting for defrosting.

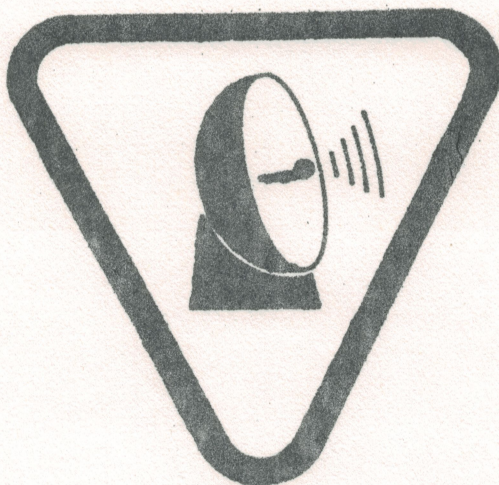
Adjustments in Cooking

- Changes are required in cooking utensils. Since metal reflects microwaves, metal cooking utensils cannot be used. Aluminum foil should be used only in small amounts. Microwave energy passes through glass, china, most ceramics, plastics and paper plates so these are suitable. Test a container by putting it in the oven for 15 seconds, if it gets hot it should not be used for cooking.
- Standing time is required for the food to complete the cooking process. A baked potato, cooked four minutes, may be hard when it comes out of the oven and have to sit for a few minutes before it can be eaten.
- You will still have to cover, rotate and stir certain foods so they cook more evenly.
- Timing is more critical in a microwave oven than in a regular oven. A few seconds of overcooking can be too much.
- You will have to experiment with placement of different kinds of food in the oven. Different brands of ovens have different microwave patterns.
- Certain cooking methods may improve results. For instance, lining a glass cake pan with paper gives a larger volume. Pies are best when baked on porous paper plates. Roasts cook better when they are rolled and longer than they are wide.
- A manual/cookbook is usually supplied with your microwave oven. Read and completely understand instructions before using the oven.

APPENDIX I

Among the safety standards are requirements that:

- Ovens must have off-on indicators, doors which will not open when the microwave power-generator is working and power generators that cannot be switched on when the door is open.
- Ovens must have a permanently affixed and clearly visible label showing the name of the manufacturer, model number, series number, date and place of manufacture, type of microwave generator, normal operating voltage, operating frequency and normal maximum power output.
- A warning sign on the oven must be visible from a distance of 1 metre (3 feet). This picture sign must be in two contrasting colors with a picture of a microwave generator in the center:



This sign should bear the words "CAUTION - MICROWAVES, ATTENTION MICRO-ONDES"

- The standard for emission of microwaves at any point 5 centimetres (2 inches) from the oven surface is set at 1 milliwatt per square centimetre.
- There should be a double set of interlock switches on the door mechanism, and, provision that if an interlock fails, the power is automatically cut off.

Radiation Emitting Devices Act, October 23, 1974
Canada Gazette, Part II, Vol. 108, No. 21-13/11/74

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5. "Electronic cooking" - Canadian House November 23, 1974
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12. Microwave Ovens - Consumer Reports, p. 221 April, 1973 - Somewhat out of date since some recommendations in report have been adapted. Interesting since it was this report which caused concern over microwave oven hazards.
13. Microwave Ovens - Radio Electronics February, 1971
14. "Facts About Microwave Oven Radiation" - Bureau of Radiological Health, U.S.A. September, 1971.



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Minister

April 1975

Additional Information or
assistance with a consumer
problem are available from:

11th Floor, S.P.C. Bldg.
2025 Victoria Avenue,
Regina. 565-5550

308 Financial Bldg.
230 - 2nd Street East
Saskatoon. 664-5725

Phone COLLECT

OR WRITE:
Box 3000, Regina